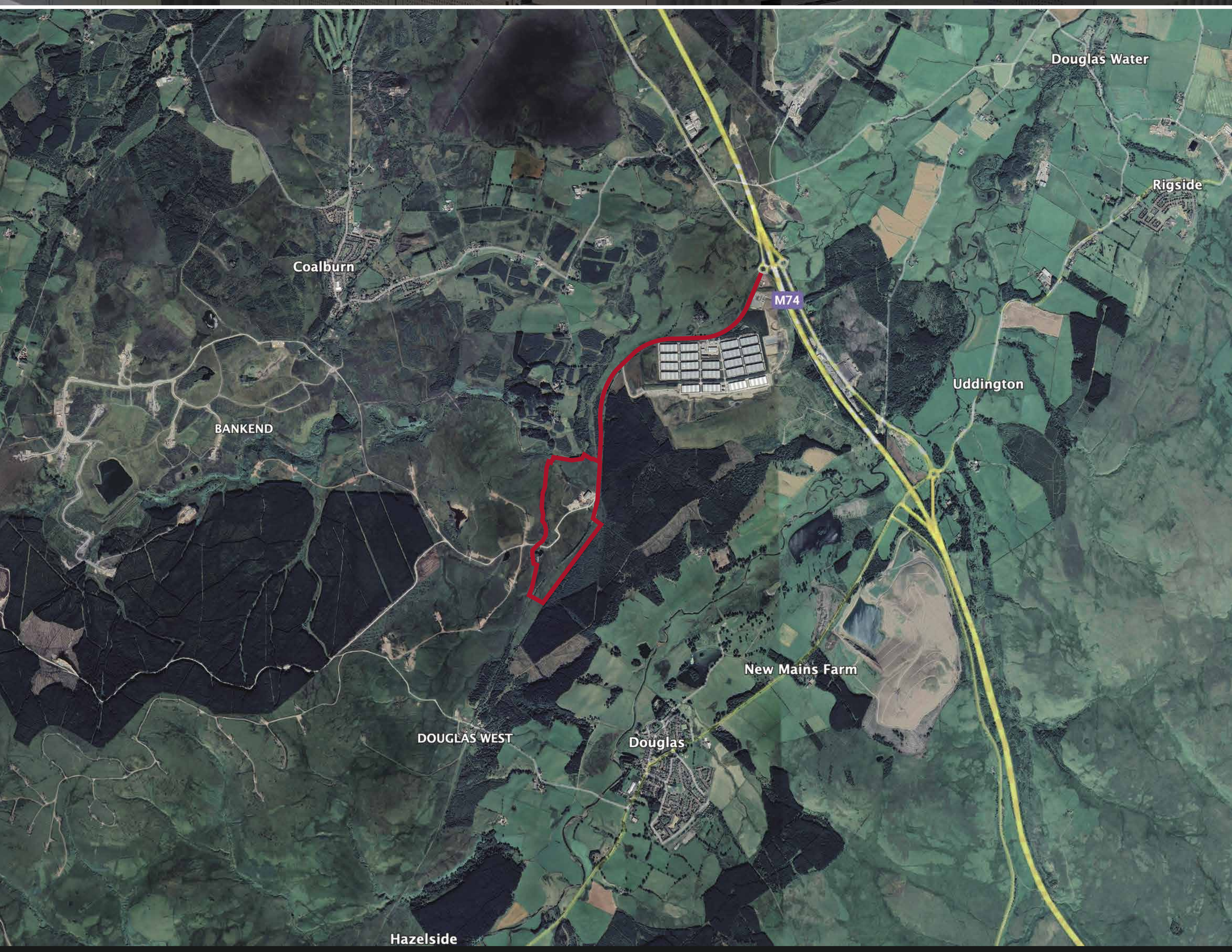
Hagshaw Long Duration Electricity Storage

3R Energy

Making a significant contribution to Scotland's sustainable energy future



Our Proposal

3R Energy is working on a new generation of renewable energy projects, which have the potential to further contribute to national renewable energy and climate change targets, as well as the local and regional economy.

We are proposing to build a 500 MW long duration electricity storage (LDES) project on land southwest of Junction 11 of the M74 in South Lanarkshire.

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Who are we?

Established in 2009, 3R Energy has been developing renewable energy projects across South Lanarkshire for over 15 years.

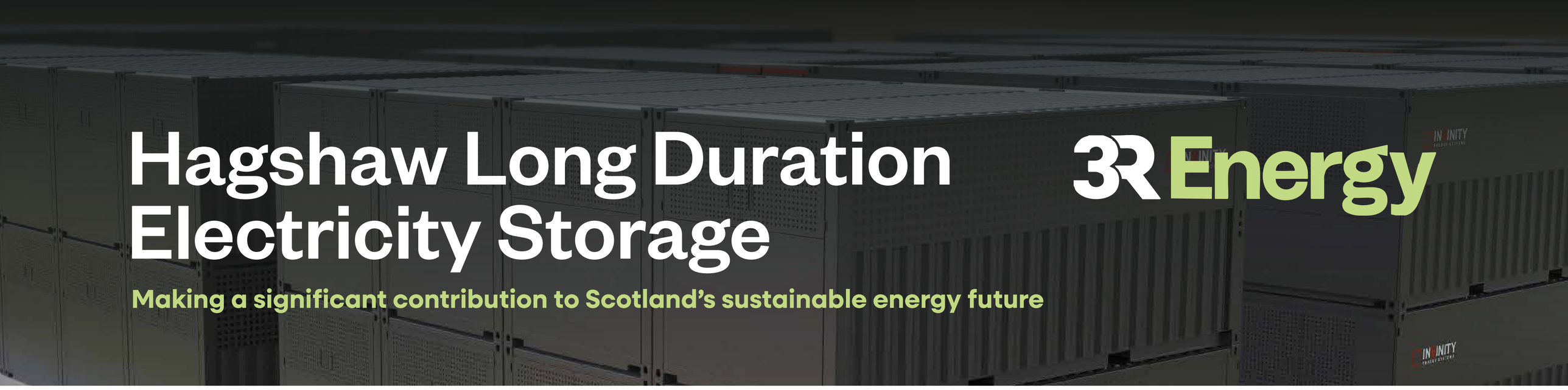
With our head office situated in Lanark, the company was initially established to help farms and rural businesses benefit from renewable energy, with the mainstay of the business being farm sized wind turbines, Combined Heat and Power (CHP) systems and biomass boilers.

More recently, 3R Energy has diversified into larger-scale renewable energy projects and has now developed over 330 megawatts (MW) of onshore wind projects within the Hagshaw Energy Cluster, with a further 80 MW of energy storage, which together will make a substantial contribution to the local area and to national renewable energy and climate change targets.

3R Energy is a founding partner of the award-winning Hagshaw Energy Cluster Development Framework project, which represents an ambitious vision for the future of the Hagshaw Energy Cluster and surrounding area, identifying opportunities to enhance and invest in the local environment, communities and place.

As a local company, 3R Energy is committed to working with the communities closest to the Hagshaw Energy Cluster for the long term to develop and deliver successful projects which create significant and tangible benefits for the local area.

We value your input and feedback in shaping this project proposal.



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Long Term Storage in a Strategic Area

Hagshaw LDES will reinforce grid infrastructure, balance electricity provision, reduce reliance on fossil fuels and reduce costs to consumers of our transition to a clean power grid.

The project adjoins the Hagshaw Energy Cluster of onshore wind projects in South Lanarkshire, and is strategically located in the Southern Scotland Electricity Transmission Zone with its ever increasing proportion of the UK's onshore wind fleet.

Hagshaw LDES will have a storage capacity of up to 500 MW of electricity, which will help to maintain grid stability and secure the power supply for thousands of UK homes while supporting the country's transition to Net Zero through low carbon infrastructure.

The Scottish Government has set a target within The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019, to achieve net-zero emissions by 2045. The provision of LDES will play a crucial role in supporting the continued decarbonisation of our electricity network in line with the UK Government's Clean Power 2030 Action Plan (CP30 Plan).

"Long duration electricity storage (LDES) is a key enabler to a secure, cost-effective and low carbon energy system"

Source: UK Government DESNZ, 2024

South Lanarkshire and Net Zero

South Lanarkshire's commitment to achieving net-zero emissions by 2045 as set out in the Council Plan, Connect (2022-27), includes ambitious interim targets of a 75% reduction in greenhouse emissions by 2030 and 90% by 2040, requires reliable, sustainable energy solutions. LDES will be essential in supporting this transition by balancing renewable electricity supply and demand, reducing reliance on fossil fuels, and enhancing energy security. With South Lanarkshire Council's Sustainable Development and Climate Change Strategy focused on 2022–2027, the development of LDES during this period will ensure that projects in South Lanarkshire will contribute to Scotland's ability to maximise the use of renewable electricity, reduce grid constraints, and create a resilient, low-carbon electricity system that supports economic growth and environmental sustainability.

"The council has a key role in the transition to a low-carbon economy and society. We have a legislative requirement to contribute to the new national greenhouse emissions reduction target of net-zero by 2045, with interim targets of 75% reduction by 2030 and 90% reduction by 2040."

South Lanarkshire Council, Public performance reports, Sustainable Development and Climate Change (2022-2027)

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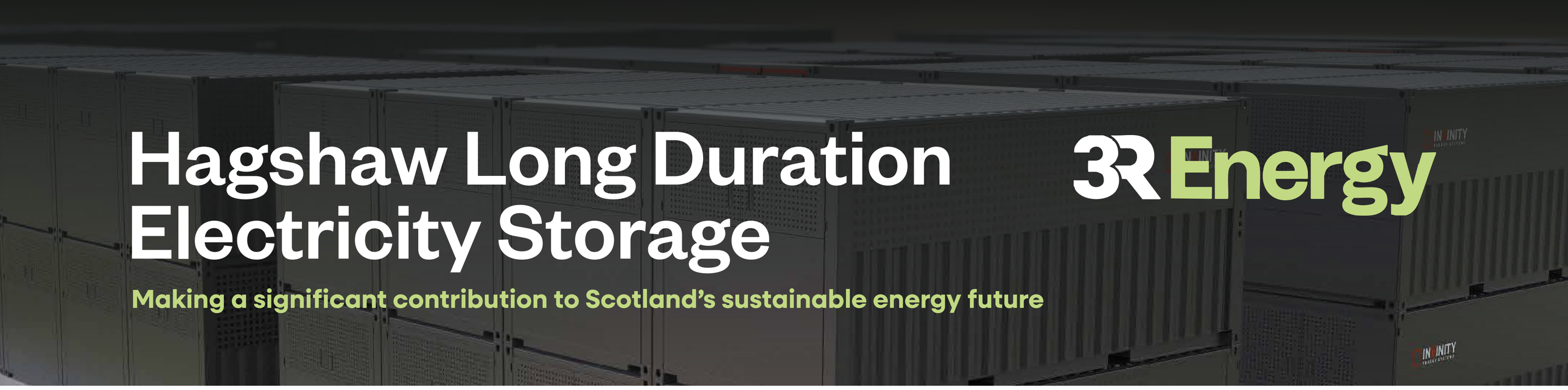
What is Long Duration Electricity Storage?

A LDES site is a facility designed to store and release energy over long periods, anywhere from several hours to days or even weeks. These sites help create a more stable and reliable electricity grid by storing surplus renewable energy and delivering it when it is needed most.

Flow Batteries: A Safe, Stable, and Proven Energy Storage Technology

At this site, we are proposing to use flow batteries, a type of LDES technology known for its safety, durability, and efficiency. Unlike lithium ion batteries, flow batteries use a water based, non-flammable electrolyte, significantly reducing fire risk. They also operate quietly and produce no emissions, making them safer and more environmentally friendly.

LDES technologies like these provide much greater capacity and longer discharge durations than traditional battery storage schemes, which typically store energy for only a few hours. With minimal degradation over time, flow batteries are built to last, ensuring a reliable and sustainable energy solution for the future.



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Why we need LDES

Electricity storage is a crucial technology that holds particular significance for Scotland. The Scottish Energy and Climate Change Directorate, in its Draft Energy Strategy and Just Transition Plan (January 2023), has emphasised the importance of electricity storage for Scotland.

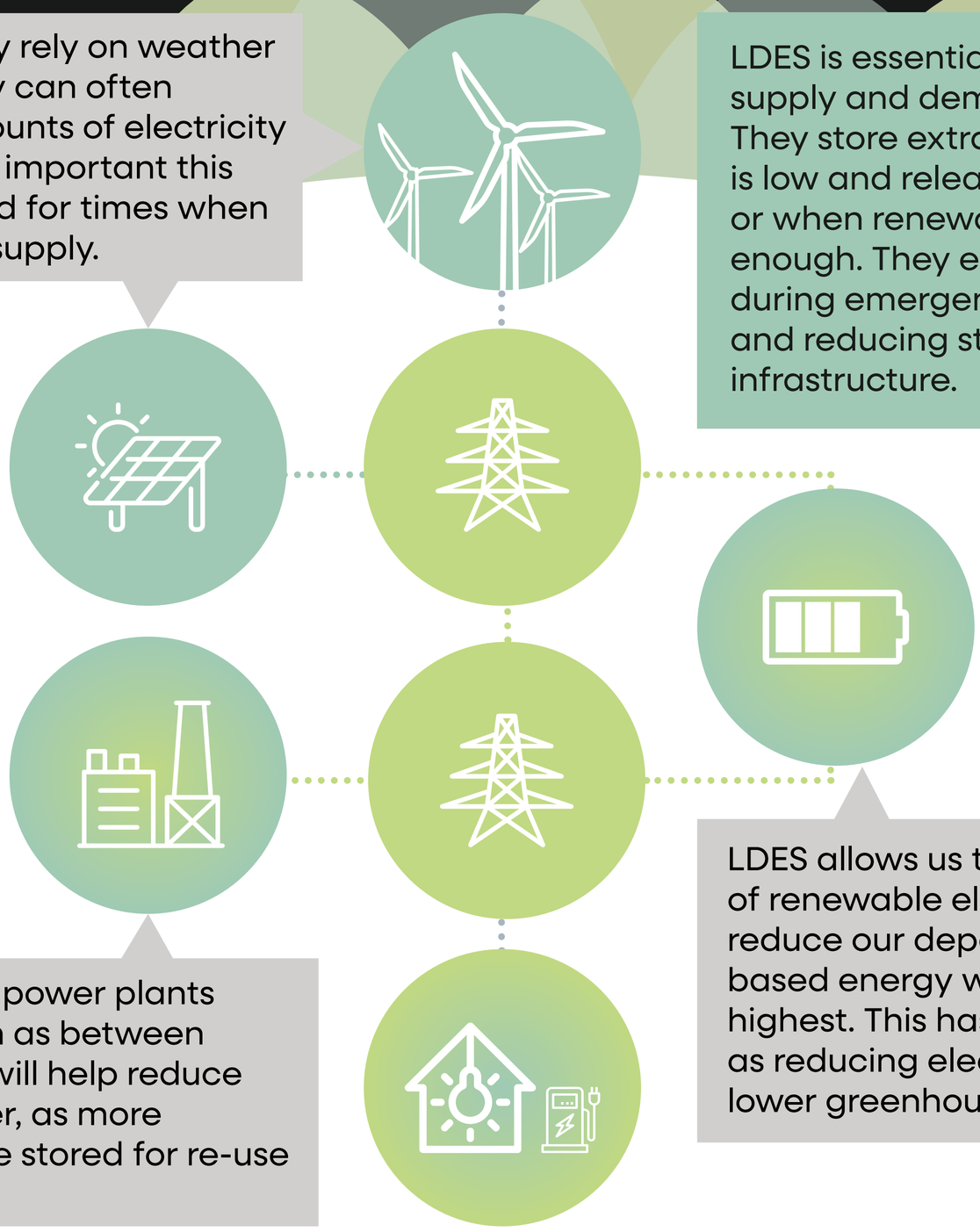
This focus aligns with the UK Government's Clean Power 2030 Action Plan (CP30 Plan). The development of LDES in the UK is a focus of Government with the Department of Energy Security and Net Zero (DESNZ) recently (October 2024) consulting on a new policy framework to enable investment in LDES. The DESNZ consultation document states:

"LDES can help to decarbonise the system by storing excess renewable generation over six hours or longer, replacing flexibility from fossil-fuelled generation and helping to alleviate constraints on the grid. LDES assets can reduce costs to consumers through lowering their energy bills, and by avoiding the need for electricity grid reinforcement and peak generation plant build."

Source: UK Government DESNZ, 2024

Wind and solar electricity rely on weather conditions, meaning they can often generate significant amounts of electricity when demand is low. It is important this excess electricity is stored for times when demand is greater than supply.

LDES is essential for managing electricity supply and demand throughout the day. They store extra electricity when demand is low and release it when demand is high, or when renewables aren't generating enough. They enhance the grid's stability during emergencies, preventing blackouts and reducing stress on the power infrastructure.



We currently turn on gas power plants during peak periods such as between 7-9am and 6-8pm. LDES will help reduce our reliance on gas power, as more renewable energy can be stored for re-use in peak periods.

LDES allows us to maximise the potential of renewable electricity sources and reduce our dependence on fossil fuel based energy when electricity demand is highest. This has financial benefits, such as reducing electricity costs, and helps lower greenhouse gas emissions.

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Why here?

The Hagshaw Cluster has long been at the heart of Scotland's renewable energy ambitions. Previously granted consent for a multi- use renewable energy and industrial hub, the strategic importance of this site remains unchanged. Now, as it transitions to become Hagshaw LDES, it is evolving to meet Scotland's growing need for electricity storage to achieve our decarbonisation requirements.

Hagshaw LDES ensures that this strategically significant renewable energy hub continues to be a cornerstone of Scotland's net zero future while delivering direct benefits to the local community.

Supporting Net-Zero Goals: Hagshaw LDES is fully aligned with national and regional priorities, supporting Scotland's clean energy future.

Job Creation & Investment: The project will generate employment opportunities, particularly during construction, and contribute to the local economy through community benefit payments and non-domestic rates.

Strengthening Grid Stability: By providing essential electricity storage, the site will provide grid balancing services in a strategic location, making clean power more reliable and cost effective.

Continued Flexibility: While the site's focus is shifting, it retains consent for commercial use, ensuring long-term adaptability.

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Community benefit

As a local company, 3R Energy is committed to working with the communities closest to the Hagshaw Energy Cluster for the long term to develop and deliver successful projects which create significant and tangible benefits for the local area.

Benefits from the Hagshaw Energy Cluster projects we have developed to date include:

Cutting Carbon, Powering the Future
The projects will prevent over 430,000 tonnes of CO2 from entering the atmosphere each year, making a significant contribution to Scotland's net-zero ambitions.

Clean Energy for Lanarkshire
Generating green electricity for over 240,000 Scottish households, enough to power all the homes in South Lanarkshire and more.

Direct Investment in Local Communities Delivering £1.6 million annually to local communities – that's £4,383 every single day, adding up to an estimated £48 million over 30 years (indexed).

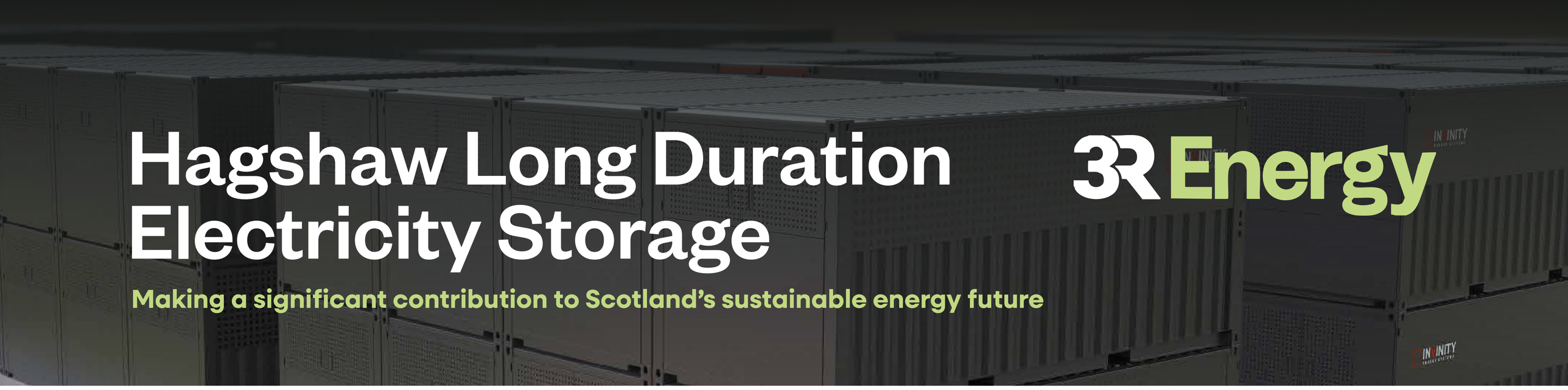
Boosting Jobs and the Economy
Creating over 1,800 job years across Scotland during the construction and development of the projects, supporting local businesses and skilled workers.

We are currently proposing a community benefit contribution of £50,000 per year (index-linked) as part of our Hagshaw LDES proposals. We are keen to hear your views on how the community benefit fund could be used.

Local business opportunities

There are exciting opportunities during the construction and operation of the Hagshaw LDES for local businesses to be involved. Please get in touch if you are interested in working with us: email **info@3renergy.co.uk**

Figures obtained from the EIA Reports for each project.



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FAQs

Are long duration electricity storage sites noisy?

Long duration electricity storage sites typically do not create sounds louder than background noise. A thorough noise evaluation is being completed for this site. To further reduce any potential noise, the project plan will include various noise mitigation measures, including the possibility of acoustic fencing and green borders, such as native tree or hedge planting.

Is long duration electricity storage safe?

Yes, LDES is a safe electricity storage solution, particularly compared to alternatives such as lithium-ion Battery Energy Storage Systems (BESS). Flow batteries, such as vanadium redox or zinc-bromine, offer several safety advantages over traditional lithium-ion batteries:

- Non-flammable electrolytes – Flow batteries use water-based liquid electrolytes, significantly reducing the risk of fire or thermal runaway.
- Low risk of explosion – Unlike lithium-ion batteries, flow batteries do not rely on highly reactive materials, making them much safer in terms of overheating or combustion.
- Stable & long-lasting – Flow battery chemistry allows for thousands of charge/discharge cycles with minimal degradation, reducing risks associated with aging batteries.
- Energy stored separately – Unlike conventional batteries, where energy is stored in a single cell, flow batteries store their energy in separate tanks. This design allows for better monitoring, maintenance, and safety control.

Will the LDES change the land classification?

The LDES is a temporary development and will not change the land classification. When the LDES has been decommissioned, the consent will require the land to be restored to its previous purpose and usage.

Will the project impact traffic in the area?

Once the LDES facility is operational, it will maintain a minimal presence, primarily necessitating occasional visits for operations and maintenance. The only period that might potentially affect traffic is during the temporary construction phase.

What happens when the site is decommissioned?

The proposal is designed to be a temporary installation. While the components are likely to be in good working order after the end of the project life, the LDES will cease operating after a period of 40 years. Components which are still in good working order will then be re-used elsewhere, with components which have no further operational use being recycled where possible.

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Next Steps

We will be holding a second consultation event on Thursday 3rd April 2025 at the Coalburn Miner's Welfare, 42 Coalburn Road, Coalburn, ML11 0LH.

Please provide your contact details to receive updates, or check our website for details of the how to attend the second event.

We'll continue accepting feedback via post or email until Friday 11th April 2025. We'll then integrate your feedback into the final planning application and submit this to the Energy Consents Unit in Spring 2025. After it's submitted, you will have the opportunity to make a representation about the application to the Scottish Ministers, via the Energy Consents Unit.

If you want to find out more about 3R and our proposals, please visit our website at **https://3renergy.co.uk/projects/hagshaw-ldes**

February 2025
Launch of public consultation

13th March 2025
First consultation event

3rd April 2025
Second consultation event

11th April 2025
End of consultation period

April 2025
Prepare S36 application

April 2025
Submission of S36 application

Autumn 2025
Decision on application expected